National Institute of Environmental Health Sciences

Seasonal effect of PM10 concentrations on mortality and morbidity in Seoul, Korea: A temperature-matched case-crossover analysis

Author(s): Yi O, Hong YC, Kim H
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Abstract:

Background: Explorations of interactions between air pollution and seasonal changes have represented one approach in examining the consequences of global warming. However, only a few studies have focused on evaluating the effects of seasonal air pollution using data on both morbidity and mortality in Asia. Method: We examined the associations between PM10 concentrations and mortality and hospital admissions in Seoul, Korea for the periods 2000-2006 and 2001-2006. We employed a temperature-matched case-crossover design, where reference periods matched case days in regard to temperature (same rounded to degrees celsius (°C)), month, and year. Results: A total of 238,826 deaths were identified, along with 98,570 and 93,553 inpatient admissions for cardiovascular and respiratory diseases, respectively. We found that the association with PM10 and mortality/morbidity increased during the summer. During the study period, 10μg/m3 increase in PM10 was associated with the increase in mortality by 0.28% (95% confidence interval: 0.12, 0.44), 0.51% (0.19, 0.83), and 0.59% (-0.08, 1.26) for non-accidental, cardiovascular, and respiratory causes. 10μg/m3 increase in PM10 was also associated with increase in hospitalization from cardiovascular and respiratory causes by 0.77% (0.53, 1.01) and 1.19% (0.94, 1.44). In the summer, the increase in mortality and hospitalization was 0.57% (0.20, 0.93), 0.64% (-0.10, 1.38), 0.50% (-1.02, 2.05), 1.52% (0.89, 2.16), and 1.55% (0.87, 2.22). Conclusions: This study provides evidence that the effect of PM10 on mortality and morbidity varies with season and increases during the summer season.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors, Temperature

Air Pollution: Interaction with Temperature, Particulate Matter

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: South Korea

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Injury, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular disease morbidity and mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory morbidity and mortality

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified